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Bayer

Agriculture Division

Fax Coversheet

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No. of Pages(Including this page): 9

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Phil,

Attached please find the disulfoton monitoring data transformation proposal. Please consider Tables 2 and 3 as confidential.

If you have any questions, please contact me.

Thank you,

Premjit P. Halarnkar

Disulfoton Monitoring Data Transformation Proposal

Disulfoton, the parent compound, and 5 of its cholinesterase inhibiting metabolites are included as a group for residue regulation in commodities. Disulfoton monitoring has been included in PDP and FDA commodity surveillance, and some data is available. Unfortunately, these programs have surveyed for the metabolites individually rather than as a group, and frequently only a few of the metabolites were analyzed rather than all. For utilization of this monitoring data in dietary risk assessments some data transformation would be required.

Proposed Methods

When reviewing the monitoring data it was observed that demeton-S-sulfone and disulfoton sulfone were more frequently detected than other metabolites. Data for one of these compounds could be used as a "sentinel" for all the metabolites. The sentinel compound could be used to calibrate the expected residues based on expected percentages of total disulfoton parent and its metabolite residues from detailed metabolism studies. This back calculation would facilitate estimating a summation of all the residues expected. In datasets where both detected and non-detected values were found: for detected residues, the residue would be representative of the sentinel metabolite, and for non-detected residues ½ LOQ would be used to represent the sentinel metabolite for the calculations. For monitoring data where no detectable residues were found, ½ the sentinel LOQ would be used to represent the sentinel metabolite.

Disulfoton metabolism profiles are available for soybeans, kale, lettuce, potato, and wheat. The ratios presented in these profiles can be used as surrogate representations for related crops. The soybean metabolism profile can be used to represent beans and peas. The lettuce metabolism profile can be used to represent leaf and head lettuce. The kale metabolism profile can be used to represent the cole crops of broccoli, cabbage, and cauliflower. The approach would be to set the sentinel metabolite equal to the percentage it is found in the representative metabolism profile. Then to back calculate from there what a metabolite group summation would be expected for that observation. Proposals for a sentinel metabolite for crop monitoring data and a representative metabolism profile is presented in the attached Table 1. Tables 2 and 3 contain referenced summaries of the metabolism profiles for each representative crop.

This proposed process is most appropriate for co-mingled food forms where composite residues are used to represent a mixed item consumption. For food forms consumed as single-serving items, additional residue transformation may be needed to represent the data. Decomposition estimations have been proposed for these calculations (Seilken method, Hahn method). For the latest TRAC presentation Mike Metzger presented a monitoring data structuring hierarchy based on the number of detectable residue observations in the dataset. In this hierarchy for single serving item monitoring data, datasets with more than 30 detectable residues would need decompostion; monitoring data with less than 30 detectable residues could be used directly as composited data without decomposition; datasets with no detectable residues could be represented as ½ the LOQ of the composite sample. For co-mingled items, monitoring data

could be used directly without decomposition. Utilizing these principles, decomposition would not be needed for disulfoton as all monitoring datasets contained less than 30 detectable residues for each commodity.

18 May 1999
LAFix Bayer Corp.

Table 1. Disulfoton Available Monitoring Data, Sentinel Metabolites, and Metabolism Profile Representatives

Crop	Monitoring Data Available	Proposed Sentinel Metabolite	All Observations Non-detects	Metabolism Profile Representative
Beans, Dried	FDA	Demeton-S-Sulfone	All ND, use 1/2 LOQ	Soybean
Beans, Succulent	FDA	Demeton-S-Sulfone	All ND, use 1/2 LOQ	Soybean
Beans, Succulent, Processed	PDP	Demeton-S-Sulfone		Soybean
Broccoli	FDA	Demeton-S-Sulfone		Kale
Cabage	FDA	Demeton-S-Sulfone		Kale
Cauliflower	FDA	Demeton-S-Sulfone	All ND, use 1/2 LOQ	Kale
Lettuce, Head	FDA	Demeton-S-Sulfone	All ND, use 1/2 LOQ	Lettuce
Lettuce, Leaf	FDA	Demeton-S-Sulfone		Lettuce
Peas, Succulent	FDA	Demeton-S-Sulfone	All ND, use 1/2 LOQ	Soybean
Peas, Succulent, Processed	PDP	Demeton-S-Sulfone	All ND, use 1/2 LOQ	Soybean
Potatoes	PDP	Demeton-S-Sulfone		Potato
Wheat	PDP	Disulfoton Sulfone		Wheat
Milk	PDP	Demeton-S-Sulfone	All ND, use 1/2 LOQ	Milk

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FDA DATA FOR DEMETON S SULFONE

Commodity	Total Number Samples Analyzed	Number of Detects	Range (ppm)
Apple Juice	260	0	ALL ND
Apples	952	0	ALL ND
Apricots	134	0	ALL ND
Asparagus	142	0	ALL ND
Dry Beans	113	0	ALL ND
Green Beans, Succ.	481	0	ALL ND
Blueberries	177	0	ALL ND
Broccoli	274	2	ND to 0.01
Chinese Cabbage	185	2	ND to 0.74
Cabbage, Red & Green	399	4	ND to 0.16
Cantaloupes	312	0	ALL ND
Carrots	552	0	ALL ND
Cauliflower	236	0	ALL ND
Celery	217	0	ALL ND
Cherries	339	0	ALL ND
Collards	121	2	ND to 0.6
Sweet corn	595	0	ALL ND
Cucumber	345	0	ALL ND
Eggplant	123	0	ALL ND
Endive (Curly & Escar.)	129	0	ALL ND
Grapefruit	111	0	ALL ND
Grapes	426	0	ALL ND
Kale	102	1	ND to 0.07
Kiwi	121	0	ALL ND
Lemons	107	0	ALL ND
Lettuce, head	712	0	ALL ND
Lettuce, leaf	625	4	ND to 0.15
Onions, dry bulb	184	0	ALL ND
Oranges	606	0	ALL ND
Peaches	586	0	ALL ND
Pears	201	0	ALL ND
Green peas	242	0	ALL ND
Sweet peppers	259	0	ALL ND
Potatoes	1042	6	ND to 0.058
Plums	103	0	ALL ND
Radish Roots	103	0	ALL ND
Raspberries	120	0	ALL ND
Snow peas	126	0	ALL ND
Spinach	224	0	ALL ND
Summer squash	187	0	ALL ND
Strawberries	632	0	ALL ND
Sweet Potatoes	212	0	ALL ND
Tomatoes	485	0	ALL ND
Watermelon	339	0	ALL ND

PDP DATA FOR DEMETON S SULFONE

Commodity	Total Number Samples Analyzed	Number of Detects	Range (ppm)	LODS
Apple Juice	132	0	ALL ND	0.003 to 0.006
Apples	182	0	ALL ND	0.003 to 0.06
Carrots	159	0	ALL ND	0.003 to 0.06
Grapes	214	0	ALL ND	0.003 to 0.06
Green Beans, Processed	189	21	ND to 0.015	0.003 to 0.006
Milk	474	0	ALL ND	0.001 to 0.003
Orange Juice	108	0	ALL ND	0.003
Oranges	208	0	ALL ND	0.003 to 0.06
Peaches	103	0	ALL ND	0.003 to 0.06
Peaches, Canned	115	0	ALL ND	0.003
Pears	108	0	ALL ND	0.003
Potatoes	148	3	ND to 0.03	0.006 to 0.06
Sweet Corn, Processed	190	0	ALL ND	0.006 to 0.06
Sweet Peas, Processed	234	0	ALL ND	0.006 to 0.06
Spinach	230	2	ND to 0.013	0.003 to 0.06
Sweet Potatoes	308	0	ALL ND	0.003 to 0.006
Tomatoes	135	0	ALL ND	0.003 to 0.006